

# **Plastic Optical Fiber Bundle with Pitched Illumination Decorations**

## **Background of the Invention**

### **1. Field of the Invention**

5 The present invention is related to plastic optical fiber bundle with spaced illumination decorations, especially to a plastic optical fiber bundle with a pitched destruction on its surface to produce illumination effect.

### **2. Description of the Prior Art**

10 As shown in Fig. 1, ordinary connection lines have a string of bulbs with different colors in a transparent plastic pipes to produce illumination effect. The bulbs 1'1 of the bulb string structure 1' connect to each other and produce an offending flashing effect when the power is turned on. However, this bulb string structure brings overheat easily and, thus, may cause fire. The production  
15 cost of this bulb string structure is high.

### **3. Summary of the Invention**

The objective of the present invention is to provide a "plastic optical fiber bundle with pitched illumination decorations" without the disadvantage of the  
20 ordinary connection lines. The outer layer of a plastic optical fiber is destructed based on an appropriate spacing unit before it is finally shaped during the fiber drawing process, so that a spaced light leak effect is produced at the position where the surface of the plastic optical fiber is destructed in a spaced manner based on an appropriate spacing unit. The plastic optical fiber bundle with  
25 pitched illumination decorations of the present invention has a protection sleeve on its surface and a illumination structure on each end, so that it can be used as a illumination decoration for different applications.

The present invention is further described with the following figures:

Fig. 1 is an ordinary connection line;

Fig. 2-1 shows the 1st view of the plastic optical fiber bundle of the present invention destructed in a pitched manner;

Fig. 2-2 shows the 2nd view of the plastic optical fiber bundle of the present invention destructed in a pitched manner;

Fig. 2-3 shows the 3rd view of the plastic optical fiber bundle of the present invention destructed in a spaced manner;

Fig. 2-4 shows the 4th view of the plastic optical fiber bundle of the present invention destructed in a pitched manner;

Fig. 3 shows the cross-sectional view of the plastic optical fiber bundle of the present invention destructed in a pitched manner;

Fig. 4 shows the light leak schematic view of the plastic optical fiber bundle of the present invention destructed in a pitched manner;

Fig. 5-1 shows the cross-sectional view of the embodiment of the present invention; and

Fig. 6 shows the side view of the present invention.

#### **4. Detailed Description of Preferred Embodiments**

The present invention is a plastic optical fiber bundle with pitched illumination decorations. PMM A and PTFE B are fed simultaneously to form an outer and an inner layers respectively. The materials are molten and extruded and then spun through a spinning nozzle to form a molten two-layer plastic optical fiber.

The surface of the molten plastic optical fiber P is destructed in a pitched manner based on an appropriate spacing unit formed by a special mold before the molten plastic optical fiber is cooled on a cooling plate. During the

destruction process, only the outer layer is destructed without affecting the inner layer. The plastic optical fiber P with pitched destructions is distributed with spaced dot destructions (a) on its surface (Fig. 2-1); The plastic optical fiber P with spaced destructions is distributed with pitched "+" (b) and "-" (c) destructions on its surface (Fig. 2-2); The plastic optical fiber P with pitched destructions is distributed with pitched square (d) destructions on its surface (Fig. 2-3); The plastic optical fiber P with pitched destructions is distributed with pitched star (e) destructions on its surface (Fig. 2-4). As shown in Fig. 3, a plastic optical fiber bundle with pitched illumination decorations (1) is formed by individual plastic optical fibers with pitched illumination decorations P1~Pn. A protection sleeve C is put onto the outer layer of the plastic optical fiber bundle with pitched illumination decorations 1.

The surface of the plastic optical fiber bundle with pitched illumination decorations 1 as shown in Fig. 4 is destructed and distributed with holes 01~01n, 02~02n and 03~03n. The plastic optical fiber P with pitched destructions is distributed with spaces P', P'', P''' on its surface. When light radiates into the plastic optical fiber P with pitched destructions, the light is refracted to the P', P'', P''' distribution area to produce a light leak effect distributed in a pitched manner. When the power is turned on and the luminary L illuminates, the plastic optical fiber bundle with pitched illumination decorations 1 produces a light leak and decoration effect that is distributed in the pitched destruction areas D1, D1n, D2, D2n. A connector W is installed between the plastic optical fiber bundle with pitched illumination decorations 1 and the plastic optical fiber bundle with pitched illumination decorations 1' for permanent connection.

The present invention is a plastic optical fiber bundle with pitched illumination decorations and the plastic optical fiber producing the light leak effect has the following characteristics:

- 5       (1) The plastic optical fiber is destructed in a spaced manner based on an appropriate unit during the fiber drawing process;
- (2) The plastic optical fiber bundle with pitched illumination decorations of the present invention does not bring overheat or cause fire; and
- (3) The connection line with pitched illumination decorations of the present invention radiates soft light that does not offend your eyes.